

REMARKS

In order to expedite the prosecution of the present application, the subject matter of dependent Claims 8, 9, 10 and 11 have been combined with independent Claim 7 and represented as newly added Claim 15. Accordingly, Claims 7-11 have been canceled and the dependencies of Claims 12-14 have been amended to reflect the change. Since this amendment results in the cancellation of claims, places the instant application in better form for consideration on appeal and does not create any new substantive issues for the Examiner, entry thereof is deemed proper under 37 CFR 1.116(b). Favorable consideration is respectfully solicited.

Claims 7-14 have been rejected under 35 USC 103(a) as being unpatentable over Shiku et al or Macromolecules, in view of Lander or Okumura et al. Applicants respectfully traverse this ground of rejection and respectfully submit that the currently claimed invention is patentably distinguishable over the prior art cited by the Examiner.

The presently claimed invention is directed to a process for forming aggregates of a hydrophobic group-containing polysaccharide, comprising the steps of mixing the hydrophobic group-containing polysaccharide with water in an amount of 30-10,000 times the weight of the hydrophobic group-containing polysaccharide to form a swollen dispersion of the hydrophobic group-containing polysaccharide and treating the swollen dispersion of the hydrophobic group-containing polysaccharide in a high pressure homogenizer which jets the polysaccharide under a pressure of from 9.8-490 MPa from an orifice into a chamber to form a dispersion of monodispersed aggregates of the polysaccharide having a particle size of from 10-30 nm and molecules of the polysaccharide having a number of association of from 3-20, wherein the hydrophobic group-containing polysaccharide has a specified formula and constitution.

The present invention provides a process for forming uniform aggregates of a hydrophobic group-containing

polysaccharide in a simple and convenient manner within a brief time, in a large scale and in which the product quality fluctuation between preparation lots and contamination by impurities are eliminated. In the present invention, the starting hydrophobic group-containing polysaccharide is present in the form of a powder and admixed with 30-20,000 times its weight with water so that individual particles of the powder become swollen with water and the swollen particles form jelly-like aggregated lumps suspended in the water. This resulting suspension is processed in a high pressure homogenizer under a pressure of 9.8-490 MPa by discharging the pressurized suspension from an orifice into a chamber to cause cavitation or a pressure drop. The discharged swollen suspension is thereby accelerated and intense collisions of the remains of the swollen suspension are brought about with each other in the chamber and with the walls of the chamber. By the generated impingement momentums and shearing forces, the hydrophobic group-containing polysaccharide is caused to disperse finely within the homogenized liquor to build up aggregates thereof in which 3-20 molecules of the polysaccharide are associated with each other to form an aggregate having a diameter of from 10-30 nanometers and a stable monodispersed dispersion present as a transparent colorless liquid not subject to the occurrence of turbidity or precipitation after standing for a prolonged period of time. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

As discussed previously, and admitted by the Examiner, the Shiku et al patent and the Macromolecules reference disclose the formation of self-aggregates of hydrophobized polysaccharides and water in which a swollen dispersion is dispersed by ultrasonication instead of the presently claimed high pressure homogenizer which jets the hydrophobic group-containing polysaccharide under a pressure of from 9.8-490 MPa from an orifice into a chamber. In view of this lack of disclosure, the Examiner has cited secondary references Lander

and Okumura et al to provide the motivation to substitute the dispersing means of Shiku et al or Macromolecules with that of the presently claimed invention.

As discussed previously, the Okumura et al reference discloses a silver halide photographic light-sensitive material comprising a support and a silver halide emulsion layer provided on the support. The silver halide emulsion layer comprises a hydrogen peroxide-treated gelatin in a ratio of not lower than 20% by weight with a total amount of gelatin contained in the silver halide emulsion layer and silver halide grains composed of silver chlorobromide having a silver chloride content of not lower than 90 mole percent. Although this reference does disclose the interchangeability of a homogenizer and an ultrasonicator for emulsifying the dye-forming couplers and other hydrophobic components which are dissolved in a high boiling solvent having a boiling point of over 150° in the presence of a low boiling organic solvent and/or water-soluble organic solvent, which is then emulsified in a hydrophobic binder such as an aqueous solution of gelatin, nothing in this reference teaches the equivalence between a homogenizer and an ultrasonicator in forming the dispersions disclosed in the primary references. Given the difference between the viscosities and composition of the dispersions of the primary references and the emulsions formed in Okumura et al, Applicants respectfully submit that only hindsight provided by the instant disclosure is motivating the Examiner to suggest the equivalence between an ultrasonicator and a homogenizer in the context of the present invention. Moreover, nothing in this reference suggests that discharge of the hydrophobic group-containing polysaccharide at a pressure of from 9.8-490 MPa from an orifice into a chamber to form a dispersion of monodispersed aggregates of the hydrophobic group-containing polysaccharide. As such, it is respectfully submitted that Okumura et al in combination with the previously discussed primary references, do not present a showing of prima facie obviousness under 35 USC 103.

The Lander reference discloses the production of a size-reduced monodispersed polysaccharide by passing the polysaccharide through a high pressure orifice using a mechanical homogenizer. However, nothing in this reference suggests the technical measure of treating a swollen dispersion of a hydrophobic group-containing polysaccharide by discharging it at a specified pressurized state from an orifice into a chamber in order to obtain an aggregate of the hydrophobic group-containing polysaccharide having a diameter of from 10-30 nanometers with 3-20 molecules being associated with each other, as required by the presently claimed invention. As such, it is respectfully submitted that Lander in combination with the primary reference does not present a showing of prima facie obviousness of the presently claimed invention under 35 USC 103.

In order to produce the aggregates of a hydrophobic group-containing polysaccharide according to the present invention, specific process steps are required. That is, the starting hydrophobic group-containing polysaccharide must be swollen with water in order to form an aqueous dispersion and then the swollen dispersion treated using a high pressure homogenizer by causing the dispersion to be discharged under a pressure of from 9.8-490 MPa through an orifice into a chamber to obtain a monodispersed dispersion of aggregates of 10-30 nanometer diameter of the polysaccharide molecules in which 3-20 molecules are held under association with each other. Given these specific steps that are required to obtain the presently claimed invention, it is respectfully submitted that it is not disclosed by the prior art cited by the Examiner.

Reconsideration of the present application and the passing of it to issue is respectfully solicited.

Respectfully submitted,


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